tary principle. We may first observe that animals, not monsters in themselves, shall have the principle of producing monsters. I have seen three 'spinae bifidae' in the children of one family: in another family only having two children, both these had very large exostoses. I have seen two harelips in the children of the same parents." (Essays and Observations, *i*, p. 246.)

Sir Richard Owen, to whom we are indebted for so many learned and illuminating comments on Hunter's notes, thought that "It is evident, however . . . that he regarded the cause of congenital malformation as existing in the primordial germ" (Animal Œconomy, p. 81); but it seems to me that Hunter realized that monsters could result from influences from without as well as from within, for he said that ". . . most of the monsters are formed as early as we can observe any formation. However, this is not always the case; therefore we have monsters before birth and after. . . . The first class of monsters are those that are born so. Now let us inquire in what respect is an animal, some time before birth, similar to a vegetable, or to the parts of animals which have the power of regeneration after birth. We are to consider, first, that the life of an animal, before birth, is very different from what it is after. This difference in the principle of life [before birth] comes much nearer to vegetation, and most probably the further back we go, this similitude is the stronger. I fancy in this inquiry we must go as far back as the first formation of the animal, when the matter is moving into different forms, similar to the formation of a new layer or a new shoot in a vegetable; for in neither animal nor vegetable are the parts formed at once. A vegetable is, at all times, similar to the first formation of an animal, or to the new formation in a lizard's tail. These [*i. e.*, the growing branch or regenerated tail] meeting with obstructions to their [proper] forms readily admit of duplication; but I believe seldom of more." (*Ibid.*, p. 243.)

(To be continued)

CLINICAL NOTES AND CASE REPORTS

ABRUPTIO PLACENTAE

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ABRUPTIO placentae was first recognized by Louise Bourgois in 1609. Rigby, in 1776, directed attention to this condition, which he designated as "Accidental Hemorrhage" in contradistinction to the inevitable bleeding in placentae praevia (Scott). Holmes, in 1901, called it "Ablatio placentae," while Kolisk, in 1903, applied the term "Infarctus hemorrhagicus uteri." De Lee names it "Abruptio placentae." Williams describes it as "Premature separation of the placenta." A severe form of abruptio placenta described by Couvelaire is known as "Uteroplacental apoplexy."

INCIDENCE OF PREMATURE SEPARATION OF THE PLACENTA

The incidence of premature separation of the placenta varies greatly in the statistical surveys of various authors. The range extends from one case, in 94 deliveries, to one case in each 894 deliveries. Holmes's series shows the occurrence as 1 in 200 cases; Polak as 1 in 305; Goethal as 1 in 94 cases. A representative figure of one case in 395 is obtained from a series of 100,000 labors in New York. Most writers agree that many cases go undiagnosed. According to Davis and McGee, partial separation occurred once in 357 deliveries, while complete separation occurred once in 770 deliveries; furthermore, one out of every three grave cases had uteroplacental apoplexy which was diagnosed only after section or postmortem examination.

Multiparity is generally thought to be a predisposing cause. Wing reports it as four to five times more frequent in multiparae than in primiparae. The incidence increases directly with the number of pregnancies. Fitzgibbon's series of premature separations has a 10 per cent incidence in primiparous women. In their respective studies, Brod and Holmes report 21 per cent and 19.2 per cent respectively, in primiparae. The highest occurrence, 36.6 per cent, is reported by Davis and McGee, who conclude "parity plays little rôle."

ETIOLOGY

Although the etiology of premature separation is as yet obscure, the preponderance of evidence points to toxemia as the most probable cause. Winter, in 1885, pointed out that ablatio placentae occurs with patients showing evidence of hypertension or albuminuria. In his publication in 1922, Prentiss Wilson states he believes that in about 90 per cent of cases there is either clinical or pathological evidence of toxemia; while Kellogg, in 1928, says, "The etiologic factor in toxemia and premature separation is sometimes the same." Williams believes it has a toxic origin—not the usual preëclamptic type, but a special type, the cause of which is still unknown. Young thought the infarcts so frequently found in placentae of toxemic patients produced the toxin by autolysis of the infarcts.

Hofbauer shows that histamin produces similar changes in the placentae of experimental animals. Morse, in 1918, produced hemorrhages in the uterus by excessive rotation of the organ. Browne, in 1928, after experimentally producing nephritis in animals, caused premature separation of the placentae in these animals by injecting them with B. pyocyaneus. Traumatism, jars, coitus, purges, coughing, twisting in bed, profound emotions, short umbilical cord, endometritis, multiple pregnancies, and hydramnions have all been advanced as causes for premature separations.

PATHOLOGY

The hemorrhage, resulting from complete or partial separation, may escape through the vagina

(external hemorrhage), or it may be entirely retained within the uterus (concealed accidental hemorrhage). The former is more common, but fortunately, less dangerous than the latter. Williams states that he has seen but one case of concealed hemorrhage in 15,000 deliveries.

The separation is started by an effusion of blood into the decidua basalis, which splits and forms a decidual hematoma in the spongiosa. The collection of blood compresses and throws out of function the adjacent placental tissue. Since the uterus cannot contract sufficiently to compress the torn, bleeding vessels because it is still distended by products of gestation, the blood escapes between the membranes and uterine wall to appear per vagina (external hemorrhage).

Concealed hemorrhages occur when (1) the margins of the placenta remain adherent; (2) the membranes retain their attachment to the uterine wall even though the placenta is completely separated; (3) the blood breaks through into the amniotic cavity, and (4) when the head, acting as a tampon, is so accurately fitted in the lower segment that no fluid can get past it. Fortunately, in a majority of cases the membranes are gradually separated from the uterine wall, so that the blood appears externally, hastening diagnosis and treatment.

Grossly the uterus, and occasionally the tubes and ovaries, have a bluish or purplish color with a coppery sheen similar to a "twisted ovarian cyst." The broad ligaments are markedly hyperemic. The outermost layers of the myometrium show the densest and deepest discoloration from the bloody effusion. In milder cases there may be just subserous ecchymosis. Microscopically, there are platelet thrombi and endothelial injury in the uterine wall (Rosenfeld). The whole process suggests the action of a lytic agent, which affects both vascular endothelium and muscle cells alike (McGee and Davis). There is an extravasation of blood with edema and disassociation of muscle fibers. The extensive destruction of muscle tissue explains the failure of the uterus to contract in some cases, even though the organ has been thoroughly emptied.

Ablatio placentae usually occurs in the latter months of pregnancy, or it may appear during labor. Most of the reported cases occurred in the last trimester. Labor commences with the onset of symptoms, and the patient seeks medical aid because of the pains or because of vaginal bleeding, or both.

When the separation is partial there may be little or no pains, and constitutional symptoms may be slight or entirely absent. The hemorrhage may be profuse or merely evident because of spotting. In more serious cases the patient experiences severe abdominal pains, frank vaginal hemorrhage (if external), or sudden violent fetal movements. In the undiagnosed, untreated, or grave cases, the patient may be in profound shock which is all out of proportion to the amount of hemorrhage. Nausea and vomiting may be present, but are of little significance. Anemia of varying degrees of severity becomes progressively more acute.

SIGNS AND SYMPTOMS

The uterus is extremely tender. It may have a normal or hard, board-like feel. Cases are reported where the uterus is of a doughy, soft consistency. In certain instances the organ assumes a globular shape. The size, especially in the external type, is but slightly larger than would be expected for the particular month of pregnancy. Tetanic contractions of the uterus may result in the failure of labor to progress. Irregularity, marked change in rate, or absence of fetal tones indicate fetal asphyxia.

During labor a sudden hemorrhage, severe abdominal pains, and aberration of fetal heart sounds are pathognomonic of a premature separation. The patient may even go into shock.

One of the most serious complications of pregnancy is the concealed accidental hemorrhage. The picture is more or less constant in its manifestations. The uterus gradually or rapidly enlarges to a size much greater than corresponds to the month of pregnancy. It is exquisitely tender, smooth or irregular in contour, stone-like in consistency, and may show no rhythmic contractions. Severe abdominal pain is present, but is less marked than in the external hemorrhage type of ablatio. As in other types, anemia appears and shock may be evident. The fetus is invariably dead.

TREATMENT

There is a divergence of opinion as to treatment of ablatio placentae. Statistics indicate that conservative treatment gives the lowest mortality figures. In his publication in 1931, Kornfeld especially demonstrates that conservative treatment gives far better results than radical procedures. In Williams' series of fifty-seven cases only three deaths occurred, each following a section. Manual dilatation, version and extraction, and difficult forceps delivery are accompanied by an increased fetal and maternal mortality, more particularly in severe cases. The high operative mortality is due, no doubt, to the fact that the most serious cases, the poorest risks, are necessarily the ones subject to the most intensive treatment.

We must differentiate between mild and severe cases, which is not an easy task. Each case, however, must be considered individually, and treated as conditions indicate. Treatment must be instituted as soon as the diagnosis is made. The procedure depends upon certain factors: (1) the period of gestation; (2) the parity of the patient; (3) whether or not labor is in progress; (4) the condition of the membranes; (5) the condition and amount of dilatation of the cervix; (6) the degree of anemia; (7) the absence or presence of infection, and (8) the general condition of the patient.

In mild cases with good labor pains, little hemorrhage, and absence of fetal distress, conservative treatment is the one of choice. Pain is relieved by hypodermic injections of morphin, the membranes are ruptured, and the vagina packed with wet gauze. An abdominal binder is applied from above downward to control further uterine distension. If the presenting part is in the pelvis,

and there is no bony disproportion, three minim doses of pituitary extract are given at twenty-minute intervals. The pulse and blood pressure are taken every half hour, while the hemoglobin and red count estimations are made at hourly intervals. In addition, the fundus is measured at one-half hour intervals. If the labor is progressing satisfactorily and the pulse, blood pressure and blood readings are constant, and the fundus shows no further distension, the patient is allowed to deliver spontaneously. Low forceps are often applied to hasten delivery.

Twenty units of pituitary extract are given as the head passes the vulvar ring. The placenta is expressed with the first contraction, or if there is a delay it is removed manually. Usually the uterus contracts satisfactorily and bleeding stops. Ergot is given before the patient leaves the delivery room. In certain instances where the uterus fails to contract it is packed with gauze. Transfusion, intravenous fluids, and other supportive treatment is given while preparation for hysterectomy is being made.

In severe cases shock and pain are combated by morphin, transfusions, intravenous fluids, heat, and other supportive measures; then, if dilatation is complete and labor may be terminated easily, the uterus is emptied from below; otherwise a cesarean section is indicated. In any event, the uterus must be emptied as promptly as possible whenever signs of acute hemorrhage (concealed or external) become evident. In most of these cases section offers the best chance because the fibers of the uterus are so frequently disorganized by the hemorrhage that when delivery is through the birth canal, postpartem hemorrhage due to atony of the uterus may cause a fatal result. An abdominal hysterectomy is then apt to be done too late.

Indications for cesarean section are as follows: (1) if labor has not begun; (2) if the cervix is undilated, even though labor is in progress; (3) the presence of any condition apt to cause long or difficult labor; (4) signs of progression of bleeding in spite of intensive conservative treatment; (5) if there is still chance to obtain a live baby without unnecessarily jeopardizing the life of the mother. In the last instance, cesarean section performed upon a mother in fairly good condition should have no more mortality than is incident to any laparotomy, and if practiced more often would materially lower the infant mortality. In addition, supravaginal hysterectomy could be done at the time if conditions so indicate, thus not taking any chances of postpartem hemorrhage as a result of uterine atony.

In the event the woman is in labor and the cervix is easily dilated manually, version and extraction or forceps delivery may be performed according to the station of the head and the ability of the accoucheur.

The prognosis in abruptio placentae is always serious. It is unfavorable for the mother and worse for the child. Maternal mortality resulting from hemorrhage, trauma, shock or sepsis varies greatly in the literature, being highest in the smaller series. Figures ranging from 7.5 to 50 per cent are reported. The fetal mortality, chiefly due to asphyxia, is from 60 to 95 per cent. Apparently the chances for both mother and fetus are better in the multiparae than in primiparae.

The influence of ablatio placentae upon subsequent labors has not been studied sufficiently to draw any definite conclusion. Rosenfeld, in 1933, reported that of five women experiencing premature separation of the placenta, four had subsequent normal deliveries; the remaining patient had a recurrence of the condition in the following pregnancy. He is of the opinion that a woman who once experienced a premature separation of the placenta need not necessarily be advised to avoid subsequent pregnancy, for her chances of having a normal pregnancy and labor are good.

REPORT OF CASES

A report of three cases occurring in private practice within a relatively short time is presented:

CASE 1.—Mrs. S., age 27, grav. I, para. 0.

Past History.—Negative.

L. M. P.—October 29, 1931. Expect. August 5, 1932. Physical examination: Essentially negative. Measurements normal. Laboratory findings: Negative. No unusual symptoms during pregnancy.

P. I.—On August 2, 6.30 p. m., while patient was at dinner, she was suddenly seized with continuous cramping abdominal pains. Rest in bed was advised at once. In twenty minutes the pain became more severe, and the woman was sent to the hospital. On her way there she began to bleed profusely, vomited, and fainted.

Examination at the time revealed the bag of waters unruptured; F. H. T. 140 to 150, irregular and indistinct; head presenting at station 1 plus; cervix undilated; moderate hemorrhage; uterus globular, contracted, and extremely tender. It was difficult to outline fetal parts. Rectal examination increased the vaginal hemorrhage. The pains were still constant. After consultation, cesarean section was performed.

On laparotomy, free blood was found in the peritoneal cavity. Right half of the uterus was blackish red and numerous black areas which simulated thrombotic vessels were scattered throughout the involved side. Near the midline on the same side there was an area which appeared gangrenous. The mottled appearance extended to the lower uterine segment anteriorly and to the pelvic floor posteriorly. On incising the uterus it was found that the placenta had separated from the uterine wall. A clot, the size of a hand, was present between the placenta and uterine wall. Membranes and live fetus delivered. The uterus contracted satisfactorily upon injection of pituitrin intramuscularly. The uterus was packed and covered with hot saline packs during the closure of the uterine wound. The hemorrhagic areas became lighter in color, the mottled areas appeared paler, while the normal musculature became hyperemic; therefore, no hysterectomy was performed.

Postoperative course was uneventful.

* * *

CASE 2.—Mrs. K., age 32, grav. I, para. 0.

Past History.—Usual childhood diseases. Tonsillectomy twice. Appendectomy, 1925.

L. M. P.—March 7, 1932; quickening on July 18; expect. December 12. Measurements: 22-26-30-18-19½ R.—19½ L.

Heaith During Pregnancy.—Much nausea and emesis; edema of extremities toward evening; constipation. On October 19, complained of pain in the left breast, but no pathology found. Laboratory findings: Negative.

P. I.—On November 20, 1932, the patient began to have shooting pains in the abdomen, which radiated

to the left side of the chest and back, especially in the left subscapular region. Examination at the time showed nothing abnormal. Bed rest was advised. The following day the pains increased in severity, especially when the uterus would contract. Bed rest was continued and sedatives administered. Four days after the onset, at 7 p. m., while the patient was at dinner, she was seized with sudden, sharp, continuous abdominal pain which radiated to the left subscapular region. Thirty minutes later the woman began to have a show of blood and mucus per vagina. She was immediately hospitalized, and examination showed the uterus to be in tetanic contraction, globular in shape, and extremely tender. F. H. T. in L. L. Q. 124, very weak. B. O. W. intact. Cervix 50 per cent effaced and two centimeters dilated. There was profuse vaginal bleeding. The patient complained of severe constant abdominal pain.

On laparotomy it was noticed that the subcutaneous tissues were markedly edematous. Free fluid was found in the peritoneal cavity. Upon the lower left portion of the uterus and broad ligament there was a large, dark, hemorrhagic area 6 by 8 centimeters in diameter. On section of the uterus, 100 cubic centimeters of free blood escaped. Following the rupturing of the membranes, meconium-stained fluid gushed out. A live baby was delivered without delay. It was pale and nearly exsanguinated. About three-fourths of the placenta was separated from the uterine wall. After injection of pituitrin the uterus contracted satisfactorily, and the hemorrhagic areas cleared up. On closer inspection of the placenta, the dark pathologic area was seen to be almost necrotic. The remainder of the tissue was apparently normal.

The mother left the operating room in good condition. The baby was given 30 cubic centimeters of intramuscular blood soon after delivery because of hemorrhage from the bowel and gums. Mother and baby made an uneventful recovery.

* * *

CASE 3.—Mrs. S., age 23, grav. I, para. 0.

Past History.—Childhood diseases. Tonsillectomy followed by "hemorrhage." Thinks she is a bleeder. Miscarriage at three months, one and one-half years ago.

L. M. P.—May 10, 1932, expect. February 13; quickening, September 22, 1932.

Physical Examination.—Essentially negative. Measurements normal. Blood pressure, 120/72.

Laboratory Findings.—Moderately heavy trace of albumin. Normal coagulation and bleeding time.

Health During Pregnancy.—Nausea and vomiting during first two months.

P. I.—On December 12, 1932, patient was in an automobile accident. She stated that she suffered no injury other than nervous shock. Soon after the accident, she experienced abdominal pain, vomiting, and slight vaginal bleeding. She was put to bed and sedatives given. The F. H. T. showed no abnormality. The bed rest was continued till day of delivery, February 22, 1932. Vaginal spotting was present during the course of observation.

Patient delivered normally, the first stage lasting twelve hours, the second one and one-half hours, and the third stage seven minutes. The placenta showed a large dark area involving one-third of the maternal surface, indicating a premature separation. Mother and baby left hospital in good condition in ten days.

COMMENT

The three cases present interesting and unusual observations. All three occurred in primiparae, two of whom were apparently normal, while the third showed evidence of toxemia. Cases 1 and 2 were seized with pains while at the dinner table, while Case 3 complained of symptoms following a nervous shock sustained in an automobile accident. Incidentally, Case 1 was sterile for four years, and Case 2 for ten years prior to the respective pregnancies reported.

One patient experienced subscapular pain occurring with the possible onset of the premature separation. We can only speculate as to the relationship between this pain and the placental separation. We can find no similar incident reported in the literature, but this finding may be of diagnostic significance.

CONCLUSIONS

1. Ablatio placentae can occur in patients who are apparently normal.
2. The premature separation may occur at any time without any demonstrable or predisposing cause.
3. The separation may be present for a considerable length of time without injury to mother or fetus, as demonstrated by Cases 2 and 3.
4. The amount of bleeding is no indication of the extent of the separation.
5. Cesarean section should be performed whenever there is an opportunity of saving the life of the baby without unnecessarily jeopardizing the life of the mother.

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A SIMPLE METHOD OF PREPARATION OF TISSUE FOR MICROSCOPIC EXAMINATION

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IT is trite to repeat that early accurate diagnosis of cancer is essential to its control. In larger centers, where the services of a trained pathologist with his equipment are available, biopsies are readily done. This constitutes a major advantage which is not enjoyed by the "occasional" surgeon or the practitioner in a small center. He is forced, in most instances, to depend upon his judgment of the gross appearance of the tissue with which he is dealing.

A course, or courses, in biology have been made an essential part of our premedical education, and in the examination of plant tissues we were expected to learn to cut microscopic sections satisfactorily. During the past few months I have attempted to prepare sections from tissues removed at operation by employing a method similar to that used by technicians in botanical laboratories.

The equipment necessary is easily obtained: a tube of ethyl chlorid so constructed that a fine spray may be directed in a given direction; a large-bottle cork; a "straight blade" shaving razor; and staining solution. The surface of the cork is first well moistened with water. Ethyl chlorid spray is then directed on this surface, and continued intermittently until a thin frosted surface is obtained. On this a small thin portion of fresh tissue or of tissue prepared by heating for a few moments in hot dilute formaldehyd solution is placed. The spray is again directed on the surface of the tissue until a firm solid mass is obtained. With a well-sharpened razor, thin portions are quickly shaved off the surface of the frozen mass